

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Withdrawn): An optical scanner comprising:

a plurality of light source units spaced from each other along a first direction, each having an optical axis along which a light beam from the light source unit is emitted, the optical axes being parallel to each other, and a position from which the light beam is emitted, the positions being spaced from each other by a predetermined distance at least along a predetermined direction;

a deflection unit that deflects the light beams together and scans the light beams along a second direction perpendicular to the first direction;

a plurality of imaging units that form an image with each of the light beams on a corresponding surface to be scanned; and

a housing unit that holds the light source units, the deflection units, and the imaging units.

Claim 2 (Withdrawn): The optical scanner according to claim 1, wherein

the predetermined direction is parallel to the first direction, and

the optical scanner further comprises a beam merging unit located on the axes between the light source units and the deflection unit, held by the housing unit, and configured to direct the light beams to the deflection unit such that distances between the light beams along the second direction are made smaller than the predetermined distance.

Claim 3 (Withdrawn): The optical scanner according to claim 1, wherein the predetermined direction is parallel to the first direction, and the light source units are held by a common support member together, and detachably held by the housing unit.

Claim 4 (Withdrawn): The optical scanner according to claim 3, wherein the common support member includes a beam merging unit that emits the light beams that have been directed closer to each other such that distances along the second direction between the light beams are smaller than the predetermined distance.

Claim 5 (Withdrawn): The optical scanner according to claim 1, wherein each of the light source unit comprises an abutting surface along a direction perpendicular to the optical axis of the light source unit, and abutting against a common support member configured to hold the light source units together.

Claim 6 (Withdrawn): The optical scanner according to claim 5, wherein the abutting surfaces are held so as to be substantially on a same plane.

Claim 7 (Withdrawn): The optical scanner according to claim 1, wherein at least one of the light source units comprises a light emission source from which the light beam is emitted, and the light beam is emitted from the light emission source along a direction not parallel to the optical axis instead of along the optical axis.

Claim 8 (Withdrawn): The optical scanner according to claim 7, wherein at least one of the light source units comprises a plurality of light emission sources, and light beams are emitted as the light beam from the light emission sources so as to intersect with each other.

Claim 9 (Withdrawn): The optical scanner according to claim 8, wherein inclinations of planes with respect to a plane perpendicular to the optical axis, the planes on which the light emission sources are located, are adjustable.

Claim 10 (Withdrawn): The optical scanner according to claims 1, further comprising:  
a beam merging unit located on the optical axes between the light source units and the deflection unit; and

a plurality of pre-deflection imaging units each located on one of the optical axes between the beam merging unit and the light source unit corresponding to the optical axis, and that converges the light beam from the light source unit in the first direction on a deflection plane of the deflection unit,

wherein respective distances between light source units and the pre-deflection imaging units differ from each other relatively to a sequence in which the light source units are aligned in the first direction.

Claim 11 (Withdrawn): The optical scanner according to claims 1, further comprising:  
a beam merging unit located on the optical axes between the light source units and the deflection unit; and

a plurality of pre-deflection imaging units each located on one of the optical axes between the beam merging unit and the light source unit corresponding to the optical axis, and that converges the light beam from the light source unit in the first direction on a deflection plane of the deflection unit,

wherein convergences of the pre-deflection imaging units differ from each other relatively to a sequence in which the light source units are aligned in the first direction.

Claim 12 (Withdrawn): The optical scanner according to claim 1, further comprising:  
a beam merging unit located on the optical axes between the light source units and the deflection unit; and

a plurality of pre-deflection imaging units each located on one of the optical axes between the beam merging unit and the deflection unit, that converges the light beam from the light source unit corresponding to the one of the optical axes in the first direction on a deflection plane of the deflection unit, arranged on a plane parallel to the first direction, and united with other of the pre-deflection imaging units into a unitary construction.

Claim 13 (Withdrawn): The optical scanner according to claim 10, wherein each of the light source units comprises at least a light emission source, and the light emission sources are disposed substantially on a same plane.

Claim 14 (Withdrawn): The optical scanner according to claim 11, wherein each of the light source units comprises at least a light emission source, and the light emission sources are disposed substantially on a same plane.

Claim 15 (Withdrawn): The optical scanner according to claim 12; wherein each of the light source units comprises at least a light emission source, and the light emission sources are disposed substantially on a same plane.

Claim 16 (Withdrawn): An image formation apparatus comprising:  
an optical write unit that forms latent images on image carriers, a development unit that develops the latent images as toner images and;  
a transfer unit that transfers the toner images onto a sheet of paper,

wherein the optical write unit includes an optical scanner having:

a plurality of light source units spaced from each other along a first direction, each having an optical axis along which a light beam from the light source unit is emitted, the optical axes being parallel to each other, and a position from which the light beam is emitted, the positions being spaced from each other by a predetermined distance at least along a predetermined direction;

a deflection unit that deflects the light beams together and scans the light beams along a second direction perpendicular to the first direction, a plurality of imaging units that form an image with each of the light beams on a corresponding surface to be scanned; and

a housing unit that holds the light source units, the deflection units, and the imaging units.

Claim 17 (Withdrawn): The image formation apparatus according to claim 16, wherein the latent images formed by the optical write unit is electrostatic, the image carriers are photosensitive bodies having the surfaces to be scanned, the optical write unit scans the light beams emitted from the optical scanner and including color image information respectively onto the surfaces to be scanned to form the latent images, the developing unit converts the latent images to visual images as the toner images using color toners corresponding to the color image information of the light beams respectively, and the transfer unit transfers the toner images onto the sheet of paper to obtain a color image.

Claim 18 (Currently Amended): An optical scanner comprising:

a plurality of light source units spaced from each other along a first direction, each having an optical axis along which a light beam from the light source unit is emitted;

a deflection unit that deflects the light beams together in a single plane at an angle with respect to the light beams and scans the light beams along a second direction perpendicular to the first direction;

a plurality of imaging units that form an image with each of the light beams on a corresponding surface to be scanned;

a housing unit that holds the light source units, the deflection units, and the imaging units, the housing unit including a beam merging unit located on the axes between the light source units and the deflection unit, configured to direct the light beams to the deflection unit such that distances between the light beams along the second direction are decreased in a sequence in which the light beams are arranged, wherein

the beam merging unit includes a plurality of separate mirrors each located on one of the optical axes between the light source units and the deflection unit, each of the plurality of separate mirrors is disposed on a separate bracket that is staggered with respect to other brackets, and

a beam turning unit that turns the light beams scanned by the deflection unit in a sequence corresponding to the sequence,

wherein the plurality of imaging units include a plurality of toroidal lenses having an optical face tangle error correction function of the deflection unit, and

each of the plural toroidal lenses images respective light beams deflected by the deflection unit in a spot on the corresponding surface to be scanned.

Claim 19 (Withdrawn): The optical scanner according to claim 18, wherein each of the light source unit comprises an abutting surface along a direction perpendicular to the optical axis of the light source unit, and abutting against a common support member configured to hold the light source units together.

Claim 20 (Withdrawn): The optical scanner according to claim 19, wherein the abutting surfaces are held so as to be substantially on a same plane.

Claim 21 (Withdrawn): The optical scanner according to claim 18, wherein at least one of the light source units comprises a light emission source from which the light beam is emitted, and the light beam is emitted from the light emission source along a direction not parallel to the optical axis instead of along the optical axis.

Claim 22 (Withdrawn): The optical scanner according to claim 21, wherein at least one of the light source units comprises a plurality of light emission sources, and light beams are emitted as the light beam from the light emission sources so as to intersect with each other.

Claim 23 (Withdrawn): The optical scanner according to claim 22, wherein inclinations of planes with respect to a plane perpendicular to the optical axis, the planes on which the light emission sources are located, are adjustable.

Claim 24 (Previously Presented): The optical scanner according to claims 18, further comprising:

a plurality of pre-deflection imaging units each located on one of the optical axes between the beam merging unit and the light source unit corresponding to the optical axis, and that converges the light beam from the light source unit in the first direction on a deflection plane of the deflection unit,

wherein respective distances between light source units and the pre-deflection imaging units differ from each other relatively to a sequence in which the light source units are aligned in the first direction.

Claim 25 (Previously Presented): An optical scanner comprising:

a plurality of light source units spaced from each other along a first direction, each having an optical axis along which a light beam from the light source unit is emitted;

a deflection unit that deflects the light beams together in a single plane at an angle with respect to the light beams and scans the light beams along a second direction perpendicular to the first direction;

a plurality of imaging units that form an image with each of the light beams on a corresponding surface to be scanned;

a housing unit that holds the light source units, the deflection units, and the imaging units, the housing unit including a beam merging unit located on the axes between the light source units and the deflection unit, configured to direct the light beams to the deflection unit such that distances between the light beams along the second direction are decreased in a sequence in which the light beams are arranged,

a beam turning unit that turns the light beams scanned by the deflection unit in a sequence corresponding to the sequence, and

a plurality of pre-deflection imaging units each located on one of the optical axes between the beam merging unit and the light source unit corresponding to the optical axis, and that converges the light beam from the light source unit in the first direction on a deflection plane of the deflection unit,

wherein convergences of the pre-deflection imaging units differ from each other relatively to a sequence in which the light source units are aligned in the first direction.



Claim 26 (Currently Amended): The optical scanner according to claim 18, wherein the beam merging unit ~~includes a plurality of mirrors each located on one of the optical axes between the light source units and the deflection unit, that~~ converges the light beam from the light source unit corresponding to the one of the optical axes in the first direction on a deflection plane of the deflection unit, arranged on a plane parallel to the first direction, ~~and united with other of the pre-deflection imaging units into a unitary construction.~~

Claim 27 (Withdrawn): The optical scanner according to claim 24, wherein each of the light source units comprises at least a light emission source, and the light emission sources are disposed substantially on a same plane.

Claim 28 (Withdrawn): The optical scanner according to claim 25, wherein each of the light source units comprises at least a light emission source, and the light emission sources are disposed substantially on a same plane.

Claim 29 (Withdrawn): The optical scanner according to claim 26, wherein each of the light source units comprises at least a light emission source, and the light emission sources are disposed substantially on a same plane.

Claim 30 (Withdrawn): An image formation apparatus comprising:  
an optical write unit that forms latent images on image carriers, a development unit that develops the latent images as toner images and;  
a transfer unit that transfers the toner images onto a sheet of paper,

wherein the optical write unit includes an optical scanner having:

a plurality of light source units spaced from each other along a first direction, each having an optical axis along which a light beam from the light source unit is emitted;

a deflection unit that deflects the light beams together and scans the light beams along a second direction perpendicular to the first direction;

a plurality of imaging units that form an image with each of the light beams on a corresponding surface to be scanned;

a housing unit that holds the light source units, the deflection units, and the imaging units, the housing unit including a beam converging unit located on the axes between the light source units and the deflection unit, configured to direct the light beams to the deflection unit such that distances between the light beams along the second direction are decreased in a sequence in which the light beams are arranged, and

a beam turning unit that turns the light beams scanned by the deflection unit in a sequence corresponding to the sequence.

Claim 31 (Withdrawn): The image formation apparatus according to claim 30, wherein the latent images formed by the optical write unit is electrostatic, the image carriers are photosensitive bodies having the surfaces to be scanned, the optical write unit scans the light beams emitted from the optical scanner and including color image information respectively onto the surfaces to be scanned to form the latent images, the developing unit converts the latent images to visual images as the toner images using color toners corresponding to the color image information of the light beams respectively, and the transfer unit transfers the toner images onto the sheet of paper to obtain a color image.

Claim 32 (Withdrawn): An optical scanner comprising:

a plurality of light source units spaced from each other along a first direction and configured to emit light beams;

a deflection unit that deflects the light beams together and scans the light beams along a second direction perpendicular to the first direction;

a plurality of imaging units that form an image with each of the light beams on a corresponding surface to be scanned; and

a beam merging unit configured to reflect at least two of the light beams and direct the light beams so as to be incident on the deflection unit closer to each other such that distances between the light beams relative to the second direction are decreased, and substantially along the first direction in the vicinity of an incident position at which the light beams are incident on the deflection unit, wherein the distances from the incident position to respective positions at which the at least two light beams are reflected by the light merging unit are different from each other.

Claim 33 (Withdrawn): The optical scanner according to claim 32, wherein an increasing order of the distances is in accordance with a sequence in which the light beams are arranged in the first direction.

Claim 34 (Withdrawn): The optical scanner according to claim 32, wherein light beams emitted from at least two of the light source units adjacent to each other on a plane in the second direction are not adjacent to each other relative to the first direction.

Claim 35 (Withdrawn): The optical scanner according to claim 32, wherein the beam merging unit comprises a mirror having a unitary construction and a plurality of independent reflecting surfaces.

Claim 36 (Withdrawn): The optical scanner according to claim 32, wherein incident angles of the at least two light beams incident on the deflection unit decrease as the distances from the incident position to the respective positions at which the light beams are reflected increase.

Claim 37 (Withdrawn): The optical scanner according to claim 32, wherein incident angles of the at least two light beams incident on the deflection unit decrease as the distances from the incident position to the respective positions at which the light beams are reflected decrease.

Claim 38 (Withdrawn): An image formation apparatus comprising:

- an optical write unit that forms latent images on image carriers, a development unit that develops the latent images as toner images and;
- a transfer unit that transfers the toner images onto a sheet of paper,
- wherein the optical write unit includes an optical scanner having:
  - a plurality of light source units spaced from each other along a first direction and configured to emit light beams;
  - a deflection unit that deflects the light beams together and scans the light beams along a second direction perpendicular to the first direction;
  - a plurality of imaging units that form an image with each of the light beams on a corresponding surface to be scanned; and
  - a beam merging unit configured to reflect at least two of the light beams and direct the light beams so as to be incident on the deflection unit closer to each other such that distances between the light beams relative to the second direction are decreased, and substantially

along the first direction in the vicinity of an incident position at which the light beams are incident on the deflection unit, wherein the distances from the incident position to respective positions at which the at least two light beams are reflected by the light merging unit are different from each other.

Claim 39 (Withdrawn): The image formation apparatus according to claim 38, wherein the latent images formed by the optical write unit is electrostatic, the image carriers are photosensitive bodies having the surfaces to be scanned, the optical write unit scans the light beams emitted from the optical scanner and including color image information respectively onto the surfaces to be scanned to form the latent images, the developing unit converts the latent images to visual images as the toner images using color toners corresponding to the color image information of the light beams respectively, and the transfer unit transfers the toner images onto the sheet of paper to obtain a color image.

Claim 40 (Withdrawn): An optical scanner comprising:

- a plurality of light source units spaced from each other along a first direction and configured to emit light beams;
- a deflection unit that deflects the light beams together and scans the light beams along a second direction perpendicular to the first direction;
- a plurality of imaging units that form an image with each of the light beams on a corresponding surface to be scanned; and
- a beam merging unit configured to reflect at least one of the light beams and direct the light beam so as to be incident on the deflection unit, closer to each other such that distances between the light beams relative to the second direction are decreased, and substantially along the first direction in the vicinity of an incident position at which the light beams are

incident on the deflection unit, wherein the beam merging unit includes a member having a reflection area/areas configured to reflect only the light beam/light beams from a predetermined light source unit/units, and a transmission area/areas configured to pass the light beam/beams from the light source unit/units other than the predetermined light source unit/units.

Claim 41 (Withdrawn): The optical scanner according to claim 40, wherein the reflection area/areas and the transmission area/areas are alternately placed relative to the first direction, and the member serves as one of a member configured to pass together non-adjacent light beams of the light beams that are not adjacent to each other along the first direction and a member configured to reflect together the non-adjacent light beams.

Claim 42 (Withdrawn): The optical scanner according to claim 41, wherein the member comprises a transparent material serving as the transmission area, and a reflective portion other than the transmission area, the reflecting portion serving as the reflection area.

Claim 43 (Withdrawn): The optical scanner according to claim 41, wherein the member comprises: a reflective member being reflective and serving as the reflection area; and a hole in a portion other than the reflection area serving as the transmission area.

Claim 44 (Withdrawn): An image formation apparatus comprising:  
an optical write unit that forms latent images on image carriers, a development unit that develops the latent images as toner images and;  
a transfer unit that transfers the toner images onto a sheet of paper,  
wherein the optical write unit includes an optical scanner having:

a plurality of light source units spaced from each other along a first direction and configured to emit light beams;

a deflection unit that deflects the light beams together and scans the light beams along a second direction perpendicular to the first direction;

a plurality of imaging units that form an image with each of the light beams on a corresponding surface to be scanned; and

a beam merging unit configured to reflect at least one of the light beams and direct the light beam so as to be incident on the deflection unit, closer to each other such that distances between the light beams relative to the second direction are decreased, and substantially along the first direction in the vicinity of an incident position at which the light beams are incident on the deflection unit, wherein the beam merging unit includes a member having a reflection area/areas configured to reflect only the light beam/light beams from a predetermined light source unit/units, and a transmission area/areas configured to pass the light beam/beams from the light source unit/units other than the predetermined light source unit/units.

Claim 45 (Withdrawn): The image formation apparatus according to claim 44, wherein the latent images formed by the optical write unit is electrostatic, the image carriers are photosensitive bodies having the surfaces to be scanned, the optical write unit scans the light beams emitted from the optical scanner and including color image information respectively onto the surfaces to be scanned to form the latent images, the developing unit converts the latent images to visual images as the toner images using color toners corresponding to the color image information of the light beams respectively, and the transfer unit transfers the toner images onto the sheet of paper to obtain a color image.

Claim 46 (Withdrawn): An optical scanner comprising:

a plurality of light source units spaced from each other along a first direction and configured to emit light beams;

a deflection unit that deflects the light beams together and scans the light beams along a second direction perpendicular to the first direction;

a plurality of imaging units that form an image with each of the light beams on a corresponding surface to be scanned; a plurality of lens members corresponding to the light beams respectively and configured to converge the light beams at least in the first direction in the vicinity of a reflecting surface of the deflection unit; and

a common support member configured to position the lens members respectively along the first direction, and support the lens member as one unit.

Claim 47 (Withdrawn): The optical scanner according to claim 46, wherein the common support member comprises a guide section configured to position at least end portions of the lens members, the end portions at ends of the lens members in the first direction.

Claim 48 (Withdrawn): The optical scanner according to claim 46, wherein the common support member comprises an abutting portion configured to position at least optical axes of the lens members.

Claim 49 (Withdrawn): The optical scanner according to claim 46, wherein the common support member is formed of a transparent resin, and comprises lens sections respectively corresponding to the lens members, having a negative refracting power, and formed as windows of the common support member.



Claim 50 (Withdrawn): An image formation apparatus comprising:

an optical write unit that forms latent images on image carriers, a development unit that develops the latent images as toner images and;

a transfer unit that transfers the toner images onto a sheet of paper,

wherein the optical write unit includes an optical scanner having:

a plurality of light source units spaced from each other along a first direction and configured to emit light beams;

a deflection unit that deflects the light beams together and scans the light beams along a second direction perpendicular to the first direction;

a plurality of imaging units that form an image with each of the light beams on a corresponding surface to be scanned; a plurality of lens members corresponding to the light beams respectively and configured to converge the light beams at least in the first direction in the vicinity of a reflecting surface of the deflection unit; and

a common support member configured to position the lens members respectively along the first direction, and support the lens member as one unit.

Claim 51 (Withdrawn): The image formation apparatus according to claim 50,

wherein the latent images formed by the optical write unit is electrostatic, the image carriers are photosensitive bodies having the surfaces to be scanned, the optical write unit scans the light beams emitted from the optical scanner and including color image information respectively onto the surfaces to be scanned to form the latent images, the developing unit converts the latent images to visual images as the toner images using color toners corresponding to the color image information of the light beams respectively, and the transfer unit transfers the toner images onto the sheet of paper to obtain a color image.

Claim 52 (Currently Amended): An optical scanner comprising:

a plurality of light source units spaced from each other along a first direction and configured to emit light beams;

a deflection unit that deflects the light beams together in a single plane at an angle with respect to the light beams and scans the light beams along a second direction perpendicular to the first direction;

a plurality of imaging units that form an image with each of the light beams on a corresponding surface to be scanned, and include a lens shared by the light beams and having no refractive power in the first direction; and

a beam merging unit configured to turn at least one of the light beams at a different position, wherein a distance from a turning point on the beam merging unit to a deflection point on the deflection unit decreases for each consecutive light beam along the first direction,

wherein the beam merging unit includes a plurality of separate mirrors each located on one of the optical axes between the light source units and the deflection unit, each of the plurality of separate mirrors is disposed on a separate bracket that is staggered with respect to other brackets,

wherein the plurality of imaging units include a plurality of toroidal lenses having an optical face tangle error correction function of the deflection unit, and

each of the plural toroidal lenses images the respective light beams deflected by the deflection unit in a spot on the corresponding surface to be scanned.

Claim 53 (Withdrawn): The optical scanner according to claim 52, wherein the beam merging unit is positioned such that a sum of an incident angle and a reflection angle to and from a turning mirror of the beam merging unit is acute.

Claim 54 (Withdrawn): The optical scanner according to claim 52, wherein at least two of the light source units are positioned opposite to each other relative to an optical axis of the lens in a cross section in the second direction.

Claim 55 (Withdrawn): The optical scanner according to claim 52, wherein distances between centers of the light beams are equal.

Claim 56 (Withdrawn): The optical scanner according to one of claim 52, wherein a distance in the first direction between centers of a pair of central light beams of the light beams is greater than distances between centers of other pairs of adjacent light beams of the light beams.

Claim 57 (Currently Amended): An image formation apparatus comprising:  
an optical write unit that forms latent images on image carriers, a development unit that develops the latent images as toner images; and

a transfer unit that transfers the toner images onto a sheet of paper,  
wherein the optical write unit includes an optical scanner having:

a plurality of light source units spaced from each other along a first direction  
and configured to emit light beams;

a deflection unit that deflects the light beams together and scans the light  
beams along a second direction perpendicular to the first direction;

a plurality of imaging units that form an image with each of the light beams on a corresponding surface to be scanned, and include a lens shared by the light beams and having no refractive power in the first direction; and  
a beam merging unit configured to turn at least one of the light beams at a different position, wherein a distance from a turning point on the beam merging unit to a deflection point on the deflection unit decreases for each consecutive light beam along the first direction,

wherein the beam merging unit includes a plurality of separate mirrors each located on one of the optical axes between the light source units and the deflection unit, each of the plurality of separate mirrors is disposed on a separate bracket that is staggered with respect to other brackets,

wherein the plurality of imaging units include a plurality of toroidal lenses having an optical face tangle error correction function of the deflection unit, and

each of the plural toroidal lenses images the respective light beams deflected by the deflection unit in a spot on the corresponding surface to be scanned.

Claim 58 (Original): The image formation apparatus according to claim 57, wherein the latent images formed by the optical write unit is electrostatic, the image carriers are photosensitive bodies having the surfaces to be scanned, the optical write unit scans the light beams emitted from the optical scanner and including color image information respectively onto the surfaces to be scanned to form the latent images, the developing unit converts the latent images to visual images as the toner images using color toners corresponding to the color image information of the light beams respectively, and the transfer unit transfers the toner images onto the sheet of paper to obtain a color image.

Claim 59 (Previously Presented): The optical scanner according to Claim 18, further comprising:

an optical face tangle error correction optical unit provided on the optical axis of each respective light beam deflected by the deflection unit.

Claim 60 (Previously Presented): The optical scanner according to Claim 59, wherein each optical face tangle error correction optical unit includes a cylindrical lens and one of the plurality of toroidal lens.

Claim 61 (New): The optical scanner of claim 18, wherein the plurality of separate mirrors are configured to each branch off a light beam and to have the toroidal lenses with the optical face tangle error correction function on a light path for respective branched-off light beams.

Claim 62 (New): The optical scanner of claim 52, wherein the plurality of separate mirrors are configured to each branch off a light beam and to have the toroidal lenses with the optical face tangle error correction function on a light path for respective branched-off light beams.

Claim 63 (New): The image formation apparatus of claim 57, wherein the plurality of separate mirrors are configured to each branch off a light beam and to have the toroidal lenses with the optical face tangle error correction function on a light path for respective branched-off light beams.